Bachelor of Computer Applications

Proposed Scheme of Syllabus

(CHOICE BASED CREDIT SYSTEM)

W.E.F ACADEMIC SESSION 2021-22

BACHELOR OF COMPUTER APPLICATIONS
(BCA) DEGREE

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY
SECTOR-16C, DWARKA, NEW DELHI-110078

Bachelor of Computer Applications

I.   BACHELOR OF COMPUTER APPLICATIONS PROGRAMME DETAILS

1.   Aim:

The programme covers rudimentary to advance concepts in Computer Science and its applications in various domains. An exceptionally broad range of topics covering current trends and technologies in the field of information technology and computer science are included in the syllabus. The hands on sessions in Computer labs using various Programming languages and tools are also given to have a deep conceptual understanding of the topics to widen the horizon of students' self- experience.

Students, who choose BCA Programme, develop the ability to think critically, logically, analytically and to use and apply current technical concepts and practices in the core development of solutions in the multiple domains.

The knowledge and skills gained with a degree in Computer Application prepare graduates for a wide range of jobs in education, research, government sector, business sector and industry. In broader perspective the mission of teaching BCA is to produce employable IT workforce, that will have sound knowledge of IT and business fundamentals that can be applied to develop and customize solutions for various Enterprises.

2.   Programme Objectives:

It is envisioned that the graduates passing out BCA degree, will achieve the following objectives and will be able to

Programme Objectives (POs)	Description
PO1	Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies.
PO2	Familiarized with Business environment and Information Technology and its Applications in different domains.
PO3	Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4	Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
PO5	Understand the front end and backend of software applications.
PO6	Gain expertise in at least one emerging technology.
PO7	Acquire knowledge about computer architecture and organization, networks, network devices and their configuration, protocols, security concepts at various level etc.

PO8	Apply techniques of software validation and reliability analysis to the development of computer programs.	
PO9	Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.	
PO10	Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in providing the solutions.	
PO11	Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur.	

## 3.	Programme Learning Outcomes:

The completion of the BCA Programme shall enable a student to:

i) To design, implement, and evaluate computer-based system, process, component, or program to meet desired needs by critical understanding, analysis and synthesis

ii)	Identify applications of Computer Science in other fields in the real world to enhance the career prospects

iii)	Realize the requirement of lifelong learning through continued education and research.

iv)	Use the concepts of best practices and standards to develop user interactive and abstract application

v)	Understand the professional, ethical, legal, security, social issues and responsibilities.

The detailed list of programme learning outcomes is as follows:

PLO	Attribute	Description
PLO1	Communication Skills	The student should be able to communicate the technical information both orally and in writing professionally.
PLO2	Use of Software Tools	Create, select, adapt and apply suitable tools and technologies to a wide range of computational activities.
PLO3	Technical Skills	Acquire necessary knowledge of technical, scientific as well as basic managerial and financial procedures to analyze and solve real world problems within their work domain
PLO4	Domain Awareness	Clarity on both conceptual and application oriented skills in commerce, Finance & Accounting and it Applications in Business context.
PLO5	Technical Support	Must be able to provide technical support for various software applications.
PLO6	Analysis and	Ability to analyze research and investigate complex computing

Bachelor of Computer Applications

	investigation of Complex Computing Problems	problems through design of experiments, analysis and interpretation of data and synthesis of the information to arrive at valid conclusions.
PLO7	Design / Development of Solutions	Apply the knowledge gained in core courses to a broad range of advanced topics in computer science, to learn and develop sophisticated technical products independently.
PLO8	Imbibe Cyber Ethics	Awareness on ethics, values, sustainability and creativity aspects of technical solutions.

Bachelor of Computer Applications

II.   CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses.

1. Types of courses in CHOICE BASED CREDIT SYSTEM (CBCS)

1.1 Core Course: A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

1.2 Elective Course: Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study   or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

 a)   **Discipline Specific Elective (DSE) Course:** Elective courses offered by the main discipline/subject of study are referred as Discipline Specific Electives.

b)   **Project work/Dissertation** is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A candidate studies such a course on his own with an advisory support by a teacher/faculty member. The work done will have to be submitted in writing as a project report / dissertation.

c)   **Generic Elective (GE) Course:** Elective courses that are generic or interdisciplinary by nature chosen from an unrelated discipline/ subject with an intention to seek exposure beyond discipline/s of choice are called Generic Electives. Students will have to choose one elective each in the third and fourth semester from the lists GE1 to GE2 given in this syllabus.

1.3 Ability Enhancement Courses (AEC)

The Ability Enhancement (AE) Courses are the course that lead to Knowledge enhancement. These are of two types.

a)   **AE   Compulsory   Course   (AECC):** Environmental   Studies,   English Communication/MIL Communication.

b)   **AE Elective Course (AEEC):** AEEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc. These courses are to be chosen from a pool of courses designed to provide value-based and/or skill-based instruction.

III PROGRAMME STRUCTURE:

The BCA programme is a three-year course of 160 credits divided into six-semesters. A student is required to complete 150 credits for the completion of course and the award of degree.

	Academic Year	Odd Semester	Credits	Even Semester	Credits
Part – I	First Year	Semester I	26	Semester II	26
Part – II	Second Year	Semester III	27	Semester IV	27
Part – III	Third Year	Semester V	27	Semester VI	27

Bachelor of Computer Applications

Total Credits – 162	80		82

Eligibility Criteria: The detailed eligibility criteria for BCA programme for an academic session will be provided in the admission brochure. However, for quick reference, the eligibility criteria of BCA programme for academic session 2021-22 is as follows:

"Pass in 12th Class of 10+2 of CBSE or equivalent with a minimum of 50% marks in aggregate* with pass in English (core or elective or functional). Mathematics or (Computer Science / Informatics Practice / Computer Applications / Multimedia & Web Technology / Data Management Application / Web Application as compulsory subject of non-vocational stream with 50 theory and 50 practical ratio). OR Three year Diploma in a branch of Engineering from a polytechnic duly approved by All India Council for Technical Education and affiliated to a recognized examining body with a minimum of 50% marks in aggregate."

Admission Criteria: Admission shall be based on the merit of the written test /CET.

IV INSTRUCTION FOR QUESTIONS PAPER SETTER:

a) Question Paper setter for each course must refer the instructions provided with the detailed syllabus of the specific courses.
b) The question paper shall be preferably set from the prescribed text books and reference books, mentioned in the syllabus.

V CREDIT ALLOCATION (BCA PROGRAMME OF STUDY)

Course	Credits	
	Theory + Practical	**Theory + Tutorial**
	Core Course (6 credits) (12 papers)	**Core Course (4 credits) (7 papers)**
Core Course Theory 19 Papers	12x4=48	7x3=21
Core Course Practical / Tutorial* 19 Papers	12x2=24	7x1=7
Elective Course **(4 Papers of 5 credits each, 5 Papers of 4 credits each and 7 Papers of 2 credits each)**		
A.1. Discipline Specific Elective (4 Papers)	4x4 = 16	
A.2. Discipline Specific Elective Practical/Tutorial* (4 Papers)	1×4 = 04	
B.1. Generic Elective/ Interdisciplinary (2 Papers)		2x3 = 06
B.2. Generic Elective Practical/ Tutorial* (2 Papers)		2x1 = 02

Bachelor of Computer Applications

1.Ability Enhancement Compulsory Courses(AECC) (3 Papers of 4 credit each and 1 Paper of 6 Credit including Minor & Major Project)	1x4 + 1x6= 10	2x4=8
2. Ability Enhancement Compulsory Courses(AECC) (2 Papers of 2 credit)		2x2 = 04
Skill Enhancement Courses (SEC) (5 Papers of 2 credit each)	5x2 = 10	
Co-Curricular Activities	2	
Total credit 162	**114**	**48**

*Wherever there is practical, there will be no tutorial and vice-versa

Bachelor of Computer Applications

III.   CBCS COURSE STRUCTURE FOR BCA PROGRAMME

1.   SEMESTER WISE PLACEMENT OF THE COURSES

Semester	CORE COURSE (18)	Ability Enhancement Compulsory Course (AECC) (3)	Skill Enhancement Course (SEC) (2)	Elective: Discipline Specific (DSE) (5)	Elective: Generic (GE) (2)
I **Total Credits 26**	CC1 (4) Discrete Mathematics	AECC 1 (4) Technical Communication			
	CC2 (4+2) Programming using 'C' Language				
	CC3(4+2) Fundamentals of IT & Computers				
	CC4 (4+2) Web Technologies				
II **Total Credits 26**	CC5 (4) Applied Mathematics	AECC2 (2) Environment Studies	SEC -1 (2)		
	CC6 (4+2) Web Based Programming				
	CC7 (4+2) Data Structure And Algorithm Using 'C'				
	CC8 108 (4+2) Database Management System				
III **Total Credits 27**	CC9 (4) Computer Network	AECC3 (2) Human Values and ethics	SEC -2 (2)	DSE- 1 (4+1)	Any course from the list GE-1(4)
	CC10 (4) Computer Organization and Architecture				
	CC11 (4+2) Object Oriented Programming with C++				
IV **Total Credits 27**	CC12(4+2) Java Programming	AECC4 (4) Introduction to Management & Entrepreneurship Development	SEC-3 (2) Personality Development Skills	DSE -2 (4+1)	Any course from the list GE-2 (4)
	CC13 (4+2) Software Engineering				
V **Total Credits**	CC14 (4+2) Operating System & Linux Programming	AECC 5 Minor Project (4)	SEC-4 (2) Summer Internship	DSE -3 (4+1)	
	CC15(4+2) Computer Graphics				

Bachelor of Computer Applications

27	CC 16 (4) Cloud computing					
VI **Total Credits 29**	CC17 (4) Datawarehousing and Data Mining	AECC 6 Major Project (6)	SEC-5 (2) Seminar/ Conference Presentation	DSE -4 (4+1)		
	CC18 (4) E-Commerce					
	CC19 (4+2) Internet of Things					
	NSS / NCC / Cultural Clubs / Technical Society / Technical Clubs	Mandatory (2)				

1.1 Skill Enhancement Course 1(SEC)
SEC 1 (choose one) Skill development course from the following

(i)   MOOC course from SWAYAM / NPTEL of minimum 2 credits. Certificate is Mandatory for the degree
(ii)   Front End Design Tool VB.Net Lab
(iii)   Statistical Analysis using Excel
(iv)   Designing Lab Photoshop

SEC 2 (choose one)

(i)   MOOC course From Swayam / NPTEL of minimum 2 credits. Certificate is Mandatory for the degree
(ii)   Designing Lab CorelDraw
(iii)   ASP.Net
(iv)   AR/VR

1.2 Discipline Specific Electives (DSE) (Choose any One Group of DSE)

DSE-A – Data Science & Analytics
1.   Basics of Python Programming
2.   Introduction to Data Science
3.   Data Visualization & Analytics
4.   Machine Learning with Python

DSE-B – Artificial Intelligence & Machine Learning
1.   Basics of Python Programming
2.   Introduction to Artificial Intelligence
3.   Machine Learning with Python
4.   Deep Learning with Python

DSE-C– Cyber Security
1.   Cyber Security
2.   Network Security
3.   Web Security
4.   IT Acts and Cyber Laws

DSE-D – Software Development

Bachelor of Computer Applications

1. Basics of Python Programming
2. Web Development with Python
3. Web Development with Java & JSP
4. Mobile Application Development

1.3 Generic Elective (GE) for BCA Students

GE 1 (choose any One)

(i) Principles of Management & Organizational Behaviour
(ii) Any One Paper Offered as open elective by other School /Department / Programme

GE 2 (choose any One)

(i) Digital Marketing
(ii) Principles of Accounting
(iii) Any One Paper Offered as open elective by other School / Department / Programme

1.4 Generic (Open) Electives for other undergraduate programmes

The following Core courses of BCA programme may be offered as Generic Elective for other undergraduate programmes. Maximum number of students from other School / Department / Programme should not exceed 20% of total intake for the programme.

S.No.	Semester	Subject Code	Subject Name
1	I	BCA 105 BCA 173	Fundamentals of Computers & IT Practical – II IT Lab
2	I	BCA 107 BCA 175	Web Technologies Practical-III Web Tech Lab
3	II	BCA 108 BCA 176	Database Management System Practical – VI DBMS Lab
4	III	BCA 205 BCA 271	Object Oriented Programming using C++ Practical – VI C++ Lab
5	III	BCA 211	Basics of Python Programming
6	VI	BCA 304	E-Commerce

Bachelor of Computer Applications

SEMESTER WISE EVALUATION SCHEME
Based on the above-mentioned course categories the semester wise Evaluation scheme of BCA Programme will be as follows:

FIRST SEMESTER EXAMINATION

Code No.	Paper	Course Category	L	T/P	Credits	Marks Internal	Marks External	Max Marks
Core Course Theory								
BCA 101	Discrete Mathematics	Core Course Theory	3	1	4	25	75	100
BCA 103	Programming Using 'C' Language	Core Course Theory	3	1	4	25	75	100
BCA 105#	Fundamentals of Computers & IT	Core Course Theory	3	1	4	25	75	100
BCA 107#	Web Technologies	Core Course Theory	3	1	4	25	75	100
Ability Enhancement Compulsory Course (AECC)								
BCA 109	Technical Communication	AECC	3	1	4	25	75	100
Core Course Practicals								
BCA 171	Practical – I 'C' Prog. Lab	Core Course Practical	0	4	2	40	60	100
BCA 173#	Practical – II IT Lab	Core Course Practical	0	4	2	40	60	100
BCA 175#	Practical-III Web Tech Lab	Core Course Practical	0	4	2	40	60	100
Bridge Course (Mandatory for Students from Non Mathematics background)								
BCA 181+	Bridge Course in Mathematics	Mandatory for Students from Non Mathematics background	2	0	0	Pass Grade	------	------
	Total Credits				**26**			**800**

+ **Non Credit subject mandatory for the students who do not have mathematics in 12th std. The student has to obtain at least pass marks (40). The examination of this paper shall be conducted by the concerned teacher teaching the course / paper as Teacher's Continuous Evaluation for total 100 marks. Only the Pass / Fail status is to be specified on the marksheet of the examination and the result of the student. Passing is mandatory for student not having mathematics in 12th std.**
# **Generic Elective (GE) for other undergraduate programmes**

TOTAL MARKS: 800

Bachelor of Computer Applications

SEMESTER WISE EVALUATION SCHEME

SECOND SEMESTER EXAMINATION

Code No.	Paper	Course Category	L	T/P	Credits	Marks Internal	Marks External	Max Marks
Core Course Theory								
BCA 102	Applied Mathematics	Core Course Theory	3	1	4	25	75	100
BCA 104	Web based Programming	Core Course Theory	3	1	4	25	75	100
BCA 106	Data Structure And Algorithm Using 'C'	Core Course Theory	3	1	4	25	75	100
BCA 108#	Database Management System	Core Course Theory	3	1	4	25	75	100
Ability Enhancement Compulsory Course (AECC)								
BCA 110	Environment Studies	AECC	2	0	2	25	75	100
***Skill Enhancement Course (AEEC) (Choose any One)**								
BCA 132	**MOOC course from SWAYAM / NPTEL	SEC-1	0	0	2	100	0	100
BCA 134	Front End Design Tool VB.Net Lab	SEC-1	0	4	2	100	0	100
BCA 136	Statistical Analysis using Excel	SEC-1	0	4	2	100	0	100
BCA 138	Designing Lab Photoshop	SEC-1	0	4	2	100	0	100
Core Course Practical								
BCA 172	Practical-IV WBP Lab	Core Course Practical	0	4	2	40	60	100
BCA 174	Practical – V DS Lab	Core Course Practical	0	4	2	40	60	100
BCA 176#	Practical – VI DBMS Lab	Core Course Practical	0	4	2	40	60	100
	Total				**26**			**900**

*NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute)
 # Generic Elective (GE) for other undergraduate programmes

TOTAL MARKS: 900
**Instructions for MOOC course
1.   MOOC Course should be done from SWAYAM/NPTEL as per the guidelines of UGC.
2.   For securing the credits, the student is required to complete the assessment of the course and to provide the certificate of the course done from SWAYAM/NPTEL.

Bachelor of Computer Applications

3.   The fees (if any) for the registration and/or assessment of the MOOC course must be borne by the student only.

4.   If the student secures more than 2 credits for the MOOC Course even then 2 credits shall be considered for this subject and the grade/marks provided by assessing authority shall be transferred to the university by the institution where the student is studying. The University's Examination Division shall take the result of the MOOC course on record and a result declared for these papers. The student must submit the result of such papers to their respective institution. All the results for the MOOC courses may be submitted before the completion of other requirements including credits requirement.

Bachelor of Computer Applications

SEMESTER WISE EVALUATION SCHEME

THIRD SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External Th	Marks External Pr	Max Marks
Core Course Theory
BCA 201	Computer Network	Core Course Theory	3	1	4	25	75	0	100
BCA 203	Computer Organization and Architecture	Core Course Theory	3	1	4	25	75	0	100
BCA 205#	Object Oriented Programming with C++	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)
BCA 207	Human Values and Ethics	AECC	2	0	2	25	75	0	100
*Discipline Specific Elective (Choose any One)
BCA 211#	Basics of Python Programming	DSE-1	4	1	5	25	50	25	100
BCA 213	Cyber Security	DSE-1	4	1	5	25	50	25	100
**Generic Elective (Choose any One)
BCA 221	Principles of Management & Organizational Behaviour	GE-1	3	1	4	25	75	0	100
BCA 223	Open Elective offered by other Department/School /programme	GE-1	3	1	4	25	75	0	100
***Skill Enhancement Course (AEEC) (Choose any One)
BCA 231	****MOOC course from SWAYAM / NPTEL	SEC-2	0	0	2	100	0	0	100
BCA 233	Designing Lab CorelDraw	SEC-2	0	4	2	100	0	0	100
BCA 235	ASP.Net	SEC-2	0	4	2	100	0	0	100
BCA 237	AR/VR	SEC-2	0	4	2	100	0	0	100
BCA	Cyber Ethics	SEC-2	2	0	2	100	0	0	100

Bachelor of Computer Applications

239										
		Core Course Practical								
BCA 271#	Practical – VII C++ Lab #	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

Generic Elective (GE) for other undergraduate programmes
* First Subject from Discipline specific chosen group
** Choose one subject from list of GE-1
*** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment

****Instructions for MOOC course
1. MOOC Course should be done from SWAYAM/NPTEL as per the guidelines of UGC.
2. For securing the credits, the student is required to complete the assessment of the course and to provide the certificate of the course done from SWAYAM/NPTEL.
3. The fees (if any) for the registration and/or assessment of the MOOC course must be borne by the student only.
4. If the student secures more than 2 credits for the MOOC Course even then 2 credits shall be considered for this subject and the grade/marks provided by assessing authority shall be transferred to the university by the institution where the student is studying. The University's Examination Division shall take the result of the MOOC course on record and a result declared for these papers. The student must submit the result of such papers to their respective institution. All the results for the MOOC courses may be submitted before the completion of other requirements including credits requirement.

TOTAL MARKS: 800

Bachelor of Computer Applications

SEMESTER WISE EVALUATION SCHEME

FOURTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 202	Java Programming	Core Course Theory	3	1	4	25	75	0	100
BCA 204	Software Engineering	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 206	Introduction to Management & Entrepreneurship Development	AECC	3	1	4	25	75	0	100
***Discipline Specific Elective (Choose any One)**									
BCA 212	Introduction to Data Science	DSE-2	4	1	5	25	50	25	100
BCA 214	Introduction to Artificial Intelligence	DSE-2	4	1	5	25	50	25	100
BCA 216	Network Security	DSE-2	4	1	5	25	50	25	100
BCA 218	Web Development Using Python and Django	DSE-2	4	1	5	25	50	25	100
****Generic Elective (Choose any One)**									
BCA 222	Digital Marketing	GE-2	3	1	4	25	75	0	100
BCA 224	Principles of Accounting	GE-2	3	1	4	25	75	0	100
BCA 226	Open Elective offered by other Department/ School /programme	GE-2	3	1	4	25	75	0	100
*****Skill Enhancement Course (AEEC)**									
BCA 232	Personality Development Skills	SEC-3	2	0	2	100	0	0	100
Core Course Practical									
BCA 272	Practical –VIII Java Lab	Core Course Practical	0	4	2	40	0	60	100
BCA 274	Practical – IX SE Lab	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

* **Second Subject from Discipline specific chosen group**
** **Choose one subject from list of GE-2**

Bachelor of Computer Applications

*** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment

Summer Training will be held for 4 weeks after the end of fourth semester. Viva-Voce will be conducted in fifth semester.

TOTAL MARKS: 800

Bachelor of Computer Applications

SEMESTER WISE EVALUATION SCHEME

FIFTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External Th	Marks External Pr	Max Marks
Core Course Theory									
BCA 301	Operating System & Linux Programming	Core Course Theory	3	1	4	25	75	0	100
BCA 303	Computer Graphics	Core Course Theory	3	1	4	25	75	0	100
BCA 305	Cloud Computing	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 307	Minor Project	AECC	0	8	4	40	0	60	100
***Discipline Specific Elective (Choose any One)**									
BCA 311	Data Visualization & Analytics	DSE-3	4	1	5	25	50	25	100
BCA 313	Machine Learning with Python	DSE-3	4	1	5	25	50	25	100
BCA 315	Web Security	DSE-3	4	1	5	25	50	25	100
BCA 317	Web Development with Java & JSP	DSE-3	4	1	5	25	50	25	100
*****Skill Enhancement Course (AEEC)**									
BCA 331	Summer Training Project	SEC-4	0	0	2	100	0	0	100
Core Course Practical									
BCA 371	Practical – X Linux - OS Lab	Core Course Practical	0	4	2	40	0	60	100
BCA 373	Practical – XI CG Lab	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

* **Third Subject from Discipline specific chosen group**
*****NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment. Evaluation will be based on Summer Training held after fourth semester.**
TOTAL MARKS: 800

Bachelor of Computer Applications

SEMESTER WISE EVALUATION SCHEME

SIXTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 302	Data Ware Housing & Data Mining	Core Course Theory	3	1	4	25	75	0	100
BCA 304#	E- Commerce	Core Course Theory	3	1	4	25	75	0	100
BCA 306	Internet of Things	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 308	**Major Project	AECC	----	12	6	40	0	60	100
Discipline Specific Elective (Choose any One)									
BCA 312	Machine Learning with Python	DSE-4	4	1	5	25	50	25	100
BCA 314	Deep Learning with Python	DSE-4	4	1	5	25	50	25	100
BCA 316	IT Act and Cyber Laws	DSE-4	4	1	5	25	75		100
BCA 318	Mobile Application Development	DSE-4	4	1	5	25	50	25	100
***Skill Enhancement Course (AEEC)**									
BCA 332	Seminar/ Conference Presentation	SEC – 5	0	0	2	100	0	0	100
Core Course Practical									
BCA 372	Practical – XII IOT Lab	Core Course Practical	0	4	2	40	0	60	100
$ BCA 374	NSS / NCC / Cultural Clubs / Technical Society / Technical Clubs	Mandatory	0	0	2	100	0	0	100
	Total				**29**				**800**

*Fourth Subject from Discipline specific chosen group.
** The student shall do the Major project in the Discipline Specific Area/Curriculum based subject /any emerging technology.
*** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment .Evaluation will be based on the presentation on any latest

Bachelor of Computer Applications

technology/research article in in-house/external seminar/conference and will be conducted by the college committee only.
 # Generic Elective (GE) for other undergraduate programmes
$ NUES (Non – University Examination Subject) Comprehensive evaluation of the students by the concerned coordinator of NCC / NSS / Cultural Clubs / Technical Society / Technical Clubs out of 100 marks as per evaluation schemes worked out by these societies / organizations at the institution / University level. The coordinators shall be responsible for the evaluation of the same. These activities shall start from the 1st semester   and evaluation shall be conducted at the end of 6th semester for the students admitted in the first semester.
Note: Any Elective Subject will be offered if minimum 1/3 rd of the total strength of students in the class will opt for it.

Bachelor of Computer Applications

SEMESTER WISE DETAILED SYLLABUS

Bachelor of Computer Applications

FIRST SEMESTER

Course Code: BCA 101   **L T C**
Course Name: Discrete Mathematics   **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:
The objective of this course is to provide the learners with the following:
1. Knowledge about sets, relations and functions.
2. Make them familiar with basics of lattices and graphs.
3. Understanding of the concept of propositional logic.
4. Acquiring the insight of combinatorics and recurrence relations

PRE-REQUISITES: Basic Concepts of Mathematics

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Understand the basics conceptual math and relations.	BTL2	PO1, PO2, PO3, PO4
CO2	Understand and apply partial order and recurrence relation and their operations.	BTL3	PO1, PO2
CO3	Compare and design, sorting and hashing techniques.	BTL4	PO1, PO2, PO3, PO4,PO5
CO4	Appraise and determine the correct logic and solutions for any given real world problem.	BTL5	PO1, PO2, PO3, PO4, PO5

Bachelor of Computer Applications

UNIT I

No. of Hours: 13 Chapter/Book Reference: TB1 [chapters 1, 2, 7], TB2 [chapters 1, 2, 4, 5], TB3 [chapters 1, 4]

SETS: Sets, Subsets, Equal Sets, Universal Sets, Finite and Infinite Sets, Operations on Sets: Union, Intersection difference and Complements of Sets, Algebra of sets, Cartesian product, Simple applications.

RELATION AND FUNCTIONS: Properties of Relations, Equivalence Relation, Partial Order Relation, Composition of relations, and Representation of relations using digraph and Matrix, Function: Domain and Range, onto, into and One to One Functions, Composite and Inverse Functions, Hashing functions, Recursive function.

PROPOSITIONAL LOGIC: Introduction, Proposition, First order logic, Basic logical operations, truth tables, tautologies, contradictions, Algebra of Propositions, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

UNIT II

No. of Hours: 10 Chapter/Book Reference: TB2 [chapter 6] TB 3 [Chapter 6]

PARTIAL ORDER RELATIONS AND LATTICES: Partial Order Sets, Totally ordered set, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal elements, Greatest lower bound, least upper bound, Lattices and Algebraic Structure, Principle of Duality, Elementary Properties of Lattices, Atoms. Sub lattices, Bounded lattice, Distributed & Complemented Lattices, Isomorphic lattices. Boolean lattice.

UNIT- III

No. of Hours: 11 Chapter/Book Reference: TB1 [chapters 5, 6], TB2 [chapter 3], TB3 [chapters 2, 3],

COMBINATORICS: Introduction, Basic Counting Principles, Permutations, Permutations of things not all different, Circular Permutations, Combinations, Restricted Permutations and Combinations, Derangement, Pascal's Triangle, Binomial Theorem (only for natural Numbers)

RECURRENCE RELATIONS: Introduction, Order of Recurrence Relations, Degree of Recurrence Relations, Linear Homogeneous Recurrence Relations, Non Homogeneous Recurrence Relations, Solution of linear homogeneous and non-non homogeneous recurrence relations.

UNIT -IV

No. of Hours: 10 Chapter/Book Reference: TB1 [chapter 8], TB2 [chapter 8], TB3 [chapter 8]

GRAPHS: Introduction, Degree of a vertex of a graph, Handshaking Theorem, types of Graphs, sub graph, Matrix representation of a graph: adjacent and incidence matrices, Isomorphic graphs, path and circuit (Floyd's and Warshall algorithms), Connected graph, Hamiltonian graph, Euler graph, Graph coloring (Vertex, Edges and Map).

Bachelor of Computer Applications

TEXT BOOKS:

TB1. Rosen, K.H., Discrete Mathematics and its Applications, McGraw Hill Education, 8th edition 2021,

TB2. Kolman, Busby and Ross, "Discrete Mathematical Structures", Pearson, 10th edition 2015

TB3. Babu Ram, "Discrete Mathematics", Pearson Education, 1st edition 2010

REFERENCE BOOKS:

RB1. D. S. Malik, M. K. Sen, "Discrete Mathematics" Cengage Learning, 2012

RB2. S.K. Sarkar "A Text Book of Discrete Mathematics" S. Chand Publications, 9th edition 2019

RB3. Singh J. P. "Discrete Mathematics for Undergraduates" ANE Books, 1st edition, 2013

RB4. Tremblay J.P. and Manohar, R., "Discrete Mathematical Structures with Applications to Computer Science" Tata McGraw Hill

Bachelor of Computer Applications

Course Code: BCA103   **L T C**
Course Name: Programming Using 'C' Language   **3 1 4**

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INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

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LEARNING OBJECTIVES:

This course will provide the learners the following:-
1.   Understanding of the syntax and the semantics of C programming language
2.   Building of their logics for solving a given problem.

PRE-REQUISITES: None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Develop programming skills by learning the fundamentals of structured programming using C Language.	BTL2	PO1, PO2, PO3
CO2	Design and develop programs using arrays, storage classes, functions and to understand memory management through pointers	BTL3	PO1, PO2, PO3
CO3	Critically analyze real world problems using structures, unions and develop applications for handling text and binary files.	BTL5	PO1, PO2, PO3, PO4, PO5
CO4	Explore the use of command line arguments, string manipulation and standard libraries.	BTL5	PO1, PO2, PO4,

Bachelor of Computer Applications

UNIT – I

No. of Hours: 12 Chapter/Book Reference: TB1 [1,2,3,4,5,6,7]; TB2 [1,2,3,4,5,6,7]; TB3 [1,2,3,4,5,6]

C basics: C character set, Identifiers and keywords, Data types, constants, symbolic constants, variable declarations, structure of basic C program, writing and executing the first C program, #include Preprocessor directive, expression statements, compound statements, operators: Arithmetic, Unary, Relational, logical, assignment, shorthand assignment, conditional and bitwise, comma operator.

C control structures: if statement, if….else statement, else if ladder, while, do….while, for, and switch statement, nested control structure, break, labelled break, continue, labelled continue statement, exit statement, goto statement.

UNIT II

No. of Hours: 13 Chapter/Book Reference: TB1 [8,9,10,13,14]; TB2 [8,9,10,12]; TB3 [7,8, 9,10,11,12]

C Functions: Functions: declaration, definition & scope, recursion, call by value, call by reference. Preprocessor directive: #define, macros with arguments, nested macros, # and ## operators, conditional compilation.

Storage Classes: automatic, external (global), static & registers. Arrays: Arrays (1D, 2D), strings, pointers, array & pointer relationship, pointer arithmetic, dynamic memory allocation, pointer to arrays, array of pointers, pointers to functions, array of pointers to functions.

UNIT – III

No. of Hours: 11 Chapter/Book Reference: TB1 [17,19,20,21]; TB2 [11,13,14]; TB3 [13,14,16]

Structures: Structures, unions, Enumeration, passing structure to functions, arrays and structures, typed of, difference between structure and union, self-referential structure, bit fields.

File handling [text (ASCII), binary]: file input output operations, file access modes, file pointers, file Positioning functions (fseek, ftell, rewind etc.)

UNIT – IV

No. of Hours: 08 Chapter/Book Reference: TB1 [15,22]; TB2 [9]; TB3 [8]

Standard library functions from stdio.h, stdlib.h, conio.h, ctype.h, math.h, string.h, process.h.,

Usage of command line arguments.

TEXT BOOKS:

TB1.   Yashwant Kanetkar, "Let us C" 17th edition, 2020.
TB2.   E. BalaGuruswamy, "Programming in ANSI C", 8th edition, 2019.
TB3.   Ashok N. Kamthane, "Programming in C", Pearson Education, 3rd Edition, 2015

REFERENCE BOOKS:

RB1. K R Venugopal, Sudeep R Prasad, "Mastering C", McGraw Hill Education; 2nd edition, 2017
RB2. V Rajaraman , "Computer Programming in C", 2nd Edition, 2019

Bachelor of Computer Applications

RB3. Kernighan and d. Ritchie, "The ANSI C Programming Language", 2015

RB4. Stephen Prata, "C Primer Plus" 6th Edition, 2014

RB5. Schaum's Outline Series, "Programming with C", 4th Edition, 2018

RB6. Reema Thareja, Programming In C" , Oxford University Press, September 2018

Bachelor of Computer Applications

Course Code: BCA 105   **L T C**
Course Name: Fundamentals of Computers and IT   **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:
The objectives of this course is to provide the learners:
1. Awareness of evolution of Computers, various types of computers its characteristics, usage, and limitations.
2. Identification of different categories of computers, their peripherals and memory.
3. Knowledge about operating system, their types, MS-Office various software.
4. Understanding of computer network fundamentals and various communication networks.
5. Overview of emerging technologies in IT i.e. AI and Machine Learning, IOT, Data Analytics etc.

PRE-REQUISITES: None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Describe computer with its characteristics, its usage, limitations and benefits, Computer Memories and its type, Software and its type	BTL2	PO1, PO2, PO3
CO2	Acquire knowledge about Number Systems, various computer languages and operating system DOS	BTL2	PO1, PO2, PO3
CO3	Attain skills in Application Software used for word processing, spreadsheet and presentation	BTL4	PO1
CO4	Understand network fundamentals and various communication network, Advance trends in IT	BTL3	PO1, PO2, PO3, PO4, PO5

Bachelor of Computer Applications

UNIT – I

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters:1,2,7,8,9], TB2:[Chapters:1,2,3,4];RB1[Chapters:6,7], RB3[Chapters:1a,1b,2a,2b,4a,5a],

Fundamentals of Computers:
Definition and Characteristics of Computer System. Computer Generation from First Generation to Fifth Generation. Classifications of Computers: Micro, Mini, Mainframe and super computers.
Computer Hardware: Major Components of a digital computer, Block Diagram of a computer, Input-output devices, Description of Computer Input Units, Output Units, CPU.
Computer Memory: Memory Hierarchy, Primary Memory – RAM and its types, ROM and its types, Secondary Memory, Cache memory. Secondary Storage Devices - Hard Disk, Compact Disk, DVD, Flash memory.

UNIT – II

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters: 10,12,14]; TB2 [Chapters:6,7]; RB1[Chapters:6A, 6B, 12A,12B], RB3 [Chapters: 8, 9]

Interaction with Computers:
Computer Software: System software: Assemblers, Compilers, Interpreters, linkers, loaders. Application Software: Introduction to MS Office (MS-Word, MS Power point, MS-Excel).
Operating Systems: Elementary Operating System concepts, Different types of Operating Systems. **DOS:** Booting sequence; Concepts of File and Directory, Types of DOS commands.
Computer Languages: Introduction to Low-Level Languages and High-Level Languages.

UNIT – III

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters:3,5,4]; TB2 [Chapters:5]; RB1[Chapter:2]

Computer Number System: Positional and Non-positional number systems, Binary, Decimal, Octal and Hexadecimal Number Systems and their inter-conversion.
Binary Arithmetic: Addition, subtraction, multiplication and division. Use of complement method to represent negative binary numbers, 1's complement, 2's complement, subtraction using 1's complement and 2's complement. Introduction to Binary Coded Decimal (BCD), ASCII Codes, EBCDIC codes.

UNIT – IV

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters:17,18]; TB2 [Chapters:9,10]; RB3[7A,7B,8A,8B]

Computer Network & Internet: Basic elements of a communication system, Data transmission modes, Data Transmission speed, Data transmission media, Digital and Analog Transmission, Network topologies, Network Types (LAN, WAN and MAN), Basics of Internet and Intranet.

Internet: Terminologies related to Internet: Protocol, Domain name, Internet Connections, IP address, URL, World Wide Web. Introduction to Client-Server Model, Search Engine, Voice over

Bachelor of Computer Applications

Internet Protocol (VOIP), Repeater, Bridge, Hub, Switch, Router, Gateway, Firewall, Bluetooth technology.

Advanced Trends in IT Applications – Brief Introduction to Cloud Computing, Internet of Things, Data Analytics, AI and Machine Learning.

TEXT BOOKS:

TB1. P. K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, 1992.
TB2. Anita Goel "Computer Fundamentals", Pearson.

REFERENCE BOOKS:

RB1. B.Ram Computer fundamentals Architecture and Organization, New Age Intl.
RB2. Alex Leon & Mathews Leon, "Introduction to Computers", Vikas Publishing.
RB3. Norton Peter, "Introduction to computers", 4th Ed., TMH, 2001.
RB4. Vikas Gupta, "Comdex Computer Kit", Wiley Dreamtech, Delhi, 2004.

Bachelor of Computer Applications

Course Code: BCA 107   **L T C**
Course Name: Web Technologies   **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a waythat every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:
The objective of this course is to provide the learners the following:
1. Knowledge about the semantic structure of HTML, Javascript, CSS, XML and bootstrap.
2. Ability to compose forms and tables using HTML, Javascript, CSS and Bootstrap.
3. Expertise to design static web pages
4. Skills to create dynamic user interface and perform Client-Side validations using JavaScript

PRE-REQUISITES: None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Develop static web pages through HTML, JavaScript, CSS and Bootstrap.	BTL6	PO4, PO5
CO2	Implement different constructs and programming techniques provided by JavaScript.	BTL3	PO4, PO8
CO3	Adapt HTML, Javascript, CSS and Bootstrap syntax and semantics to build web pages.	BTL1, BTL2	PO4
CO4	Develop Client-Side Scripts using JavaScript to display the contents dynamically	BTL3, BTL6	PO4,PO5

Bachelor of Computer Applications

UNIT – I

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters: 1-3]; TB2 [Chapters: 2]; TB3 [Chapters: 1-4]

World Wide Web: Introduction, Web page, Home page, Web site, Static and Dynamic website, Client Server computing concepts. Web Client and Web Server, Web Browser, Client Side and server side Scripting Languages.
HTML Overview: Introduction to HTML, HTML Document structure tags, HTML comments, Text formatting, inserting special characters, anchor tag, adding images and Sound, lists types of lists, tables, frames and floating frames, Developing Forms, Image maps.

UNIT – II

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters: 4-5]; TB2 [Chapters: 3-5]; TB3 [Chapters: 5-12]; TB4 [Chapters 1-3]

Cascading Style Sheet: Types of Style Sheets – Internal, inline and External style sheets, creating styles, link tag, CSS Properties, CSS Styling, Style Selector- Id, class name and Pseudo Class.
BootStrap Basics: Introduction to Bootstrap, Responsive web design, Linking with Bootstrap, container class, grids, tables, images, buttons, typography classes, jumbotron, glyphicons,

UNIT – III

No. of Hours:11 Chapter/Book Reference: TB1 [Chapters: 4-5]; TB2 [Chapters: 3-5]; TB3 [Chapters: 5-12]

Introduction to Java Script: Data Types, Control Statements, operators, dialog boxes, Built in and User Defined Functions, Objects in Java Script, Handling Events, basic validations, Document Object Model, Browser Object Model.

UNIT – IV

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters]; TB2 [Chapter: 7, 9]; TB3 [Chapter: 1]

XML: Introduction, Features, XML Naming rules, Building block of XML Document, Difference between HTML & XML, XML Parser, DTD's Using XML with HTML and CSS.
Web Hosting Concepts: Concept of domain- Physical domain, virtual domain, registering a domain, need of IP addressing, Web Hosting and Publishing Concepts

TEXT BOOKS:

TB1. The complete reference HTML and CSS, by Thomas A powell, TMH publication.
TB2. Jeffrey C. Jackson, "Web Technologies: A Computer Science Perspective", Pearson
TB3. Internet and World Wide Web Deitel HM, Deitel ,Goldberg , Third Edition.
TB4. Bootstrap: Responsive Web development, Jake Spurlock, O'reilly, First Edition

REFERENCE BOOKS:

RB1. HTML Black Book , Stephen Holzner, Wiley Dreamtech.
RB2. Rajkamal, "Web Technology", Tata McGraw-Hill, 2001.
RB3. Jeffrey C. Jackson, "Web Technologies : A Computer Science Perspective", Pearson.
RB4. XML How to Program by Deitel Deitel Nieto.

Bachelor of Computer Applications

Course Code: BCA 109   **L T C**
Course Name: Technical Communication   **3 1 4**

LEARNING OBJECTIVES:
This course will provide the learners the following:
1. Understanding of the correct use of English Language.
2. The student will improve in oral as well as written communication skills.

PRE-REQUISITES: Nil

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	The student will become familiar with the basics of communication and its importance in the organizational world.	BTL1	PO9, PO11
CO2	To improve the business writing skills also will become well aware how to write effective resume to enter the global world.	BTL2 & 3	PO9, PO11
CO3	To improve the listening skills by knowing well how to negotiate and give effective presentations.	BTL5	PO9, PO11
CO4	To make use of effective business language and give a professional look to oneself.	BTL6	PO9, PO11

Bachelor of Computer Applications

UNIT – I

No. of Hours: 10 Chapter/Book Reference: TB1, TB2, TB3, TB4

Concepts and Fundamentals: Introduction to Technical Communication, Need and importance of communication, channel, Distinction between general and technical communication, nature and features of technical communication, Seven Cs of communication, Types of Technical communication, style in technical communication, technical communication skills, Language as a tool of Communication, History of development of Technical Communication, Computer Aided Technical Communication

UNIT-II

No. of Hours: 12 Chapter/Book Reference: TB1, TB2, TB3

Oral Communication: Principles of effective oral communication, Introduction of Self and others, Greetings, Handling Telephone Calls
Interviews: Meaning & Purpose, Art of interviewing, Types of interview, Interview styles, Essential, Techniques of interviewing, Guidelines for Interviewer, Guidelines for interviewee.
Meetings: Definition, Kind of meetings, Agenda, Minutes of the Meeting, Advantages and disadvantages of meetings/ committees, Planning and organization of meetings.
Project Presentations: Advantages & Disadvantages, Executive Summary, Charts, Distribution of time (presentation, questions & answers, summing up), Visual presentation, Guidelines for using visual aids, Electronic media (power-point presentation).
The technique of conducting Group Discussion and JAM session.

UNIT-III

No. of Hours: 12 Chapter/Book Reference: TB1, TB2, TB3, TB4

Written Communication: Overview of Technical Writing: Definition and Nature of Technical Writing, Basic Principles of Technical Writing, Styles in Technical Writing,
Note – Making, Notice, E-mail Writing
Writing Letters: Business letters, Persuasive letters- Sales letters and complaint letters
Office memorandum, Good news and bad news letters
Report Writing: Definition & importance; categories of reports, Elements of a formal report, style and formatting in report
Special Technical Documents Writing: Project synopsis and report writing, Scientific Article and Research Paper writing, Dissertation writing: Features, Preparation and Elements
Proposal Writing: Purpose, Types, characteristics and structure
Job Application: Types of application, Form & Content of an application, drafting the application, Preparation of resume.

UNIT-IV

No. of Hours: 10 Chapter/Book Reference: TB3, RB1, RB3

Soft Skills: Business Etiquettes – Professional Personality, Workplace Protocols, Cubicle.
Non-Verbal Communication: Kinesics and Proxemics, Paralanguage
Interpersonal Skills
Language Skills: Improving command in English, improving vocabulary, choice of words, Common problems with verbs, adjectives, adverbs, pronouns, tenses, conjunctions, punctuations, prefix, suffix, idiomatic use of prepositions. Sentences and paragraph construction, improve spellings, common errors and misappropriation, Building advanced Vocabulary (Synonyms, Antonyms), introduction to Business English.

Bachelor of Computer Applications

TEXTBOOKS:

TB1. Kavita Tyagi and Padma Misra , "Advanced Technical Communication", PHI, 2011
TB2. P.D.Chaturvedi and Mukesh Chaturvedi, "Business Communication – Concepts, Cases and Applications", Pearson, second edition.
TB3. Rayudu, "C.S- Communication", Himalaya Publishing House, 1994.
TB4. Asha Kaul , "Business Communication", PHI, second edition.

REFERENCES:

RB1. Raymond Murphy, "Essential English Grammar- A self study reference and practice book for elementary students of English" , Cambridge University Press, second edition.
RB2. Manalo, E. & Fermin, V. (2007). Technical and Report Writing. ECC Graphics. Quezon City.
RB3. Kavita Tyagi and Padma Misra , "Basic Technical Communication", PHI, 2011.
RB4. Herta A Murphy, Herbert W Hildebrandt and Jane P Thomas, "Effective Business Communication", McGraw Hill, seventh edition.

Bachelor of Computer Applications

		L	T/P	C
Course Code: BCA 171				
Course Name: Practical -1 'C' Prog. Lab		0	4	2

LEARNING OBJECTIVES:
This course will provide the learners the following:-
1. Understanding of the syntax and the semantics of C programming language
2. Building of their logics for solving a given problem.

PRE-REQUISITES: None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Develop programming skills by learning the fundamentals of structured programming using C Language.	BTL3	PO1, PO2, PO3
CO2	Design and develop programs using arrays, storage classes, functions and to understand memory management through pointers	BTL4	PO1, PO2, PO3
CO3	Critically analyze real world problems using structures, unions and develop applications for handling text and binary files.	BTL5	PO1, PO2, PO3,PO4, PO5
CO4	Explore the use of command line arguments, string manipulation and standard libraries.	BTL5	PO1, PO2, PO4,

List of Practicals		
S. No.	**Detailed Statement**	**Mapping to CO #**
Core Practicals (Implement minimum 8 out of 10 practical)		
1.	Write a program to convert temperature from Celsius to Fahrenheit by taking input from the user.	CO1
2.	Write a program to find the greatest number among 3 numbers given by the user.	CO1
3.	Write a program to check if a given number is a prime number or not.	CO1
4.	Write a program to display the following pattern upto N rows, taking the value of N from the user: 1 2 3 4 5 6 7 8 9 10	CO1

5.	Write a program to input marks of 50 students using an array and display the average marks of the class.	CO2
6.	Write a program to search for a number entered by the user in a given array and display the array in ascending order.	CO2
7.	Write a program to check if a string is palindrome or not.	CO2
8.	Write a program to add, subtract, multiply and divide two numbers using pointers.	CO2
9.	Write a program to create a structure for employees containing the following data members: Employee ID, Employee Name, Age, Address, Department and Salary. Input data for 10 employees and display the details of the employee from the employee ID given by the user.	CO3
10.	Write a program to create two files with names EvenFile and OddFile. Input 20 numbers from the user and save even numbers in EvenFile and odd numbers in OddFile.	CO3
Application Based Practicals (Implement minimum 5 out of 10 practical)		
11.	Write a menu driven program to construct a calculator for following arithmetic operations: addition, subtraction, multiplication, division, average and percentage.	CO1
12.	Write a menu driven program to perform the following operations: (i) Print armstrong numbers upto N, (ii) Display prime numbers between 1 to N, (iii) Reverse of an integer	CO1
13.	Write a program to convert a hexadecimal number into a binary number.	CO1
14.	Write a program to calculate factorial of a number and display fibonacci series upto N terms using recursive functions.	CO2
15.	Write a program to perform matrix addition, (ii) matrix multiplication, and (iii) Matrix transpose) on 2D arrays.	CO2
16.	Write a program to make use of arrays with structures in the following ways: (i) Use array as a structure data member (ii) Create array of structure variables	CO3
17.	Write a program to compare the contents of two files by taking names of the files through command line arguments.	CO3, CO4
18.	WAP to perform I/O and make use of file positioning functions on Binary files. (using fseek, ftell, rewind functions)	CO4
19.	Write a menu driven program to implement the following string	CO4

Bachelor of Computer Applications

	operations: (i) Calculate length of a string (ii) Concatenate at the end of a given (iii) Copy one string to another (iv) Compare contents of two strings (v) Copy nth character string to another	
20.	Write a program to read time in string format and extract hours, minutes and second also check time validity	CO4
Note: **1. In total 15 practical to be implemented. 2 additional practical may be given by the course instructor.** **2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.**		

Bachelor of Computer Applications

Course Code: BCA 173

Course Name: Practical – II IT Lab

L	T/P	C
0	4	2

LEARNING OBJECTIVES:
The objective of this course is to provide the learners :
1. Basic knowledge of computers Software and Hardware
2. Expertise in using DOS Commands.
3. Attain proficiency in using application software for Word Processing, Spreadsheet and Presentation.

PRE-REQUISITES: Nil

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Work with basic DOS Commands and Windows Explorer.	BT3	PO1, PO2
CO2	Create Word Documents using advanced features of MS Word.	BT3	PO1,PO2
CO3	Create Worksheet using advanced features of MS Excel.	BT3	PO1,PO2
CO4	Create interactive Presentation using advanced features of MS Power-point.	BT3	PO1, PO2
List of Practicals			

S. No.	Detailed Statement	Mapping to CO #
Core Practicals (Implement minimum 10 out of 15 practical)		
1.	To explore the System settings - Personalisation, System, Devices, Apps, Network & Internet.	CO1
2.	To practice basic DOS commands like cd, md, dir, erase, cls, copy, date etc.	CO1
3.	To explore Windows Explorer functionalities like create, rename, move, delete folder and files etc.	CO1
4.	To practice the use of basic formatting features - Format Painter, Indentation, Line spacing, background color, find, replace, dictate commands.	CO2
5.	To practice the use of Bullets, numbering, multilevel lists and use of Table Feature- Insert table with rows and columns, draw tables, excel	CO2

	spreadsheet and quick tables etc.	
6.	To practice the use of Insert Features – add picture, Chart, SmartArt, WordArt, Equation, Symbols, Header and Footer, Page Numbering etc. and the use of Design Features – Watermark, Page color, Page Border, Themes implementation etc.	CO2
7.	To practice the use of Layout Features – Margins, Orientation, Size, Columns, Indent, Spacing etc.	CO2
8.	To practice the use of Mail Merge Feature to generate Envelops and Labels.	CO2
9.	To practice the use of Excel basic formatting features – Wrap Text, Insert and Delete (Cells, Sheet, Row or Column), Format – Cell Height, Cell Width, Hide, Un Hide Cell, Protection, Freeze and Unfreeze panes, Macros etc.	CO3
10.	To practice the use of Insert Features- Pivot Table, Pivot Chart, Picture, Chart and its formatting and Design and the use of Page Layout Features- Margins, Orientation, Page Break , Background, Height and Width of Cells.	CO3
11.	To practice the use of Formula Features – user defined function, predefined functions – Logical, Date, Time, Maths and the use of Data Manipulation Features – Sort, Filter, Advanced Filters, Whatif analysis.	CO3
12.	To practice the creation of Blank presentation and Selecting Themes and the use of the basic design features – Adding New Slides, Reuse slides, Slides layout etc.	CO4
13.	To practice the use of Insert Features – add pictures, screenshots, shapes, wordart, audio, video, date-time etc. and use of Design Features- Changing the theme of presentation, format background and design ideas.	CO4
14.	To practice the use of Transition features to be applied on Slides content, setting sound, duration etc. and the use of Animation Features to be applied on presentation of Slide, set animation timings and rehearse etc.	CO4
15.	To practice the use of Slide Show Features – Custom Slide Show, Rehearse Timing etc.	CO4
Application Based Practicals (Implement minimum 5 out of 8 practical)		
16.	Create a Folder by your name in your system, store all the work done in this semester inside that folder.	CO1
17.	Create your Resume using basic formatting features like : table, bullets, wordart etc	CO2

Bachelor of Computer Applications

18.	Design an Invitation to Birthday Party using mail merge features send the invitation to 10 friends.	CO2
19.	Write an Article for Magazine with 3 columns and hyperlink.	CO2
20.	Create your own marksheet using basic formatting features.	CO3
21.	Create a list of marks of 10 students create charts and pivot table.	CO3
22.	Prepare a Sales summary and use features like sort, filter etc. to manipulate the data.	CO3
23.	Create a Power Point Presentation on any topic of your choice using animation and transition features.	CO4

Note:
1. In total 15 practical to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

Bachelor of Computer Applications

Course Code: BCA 175		**L**	**T/P**	**C**
Course Name: Practical-III Web Tech Lab		**0**	**4**	**2**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to:
1. Apply the Semantic Structure of HTML, javascript, CSS, bootstrap and XML
2. Design forms and tables using HTML, CSS and bootstrap.
3. Design Client-Side programs using JavaScript
4. Design and develop static Web page.

PRE-REQUISITES: None.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Develop static web pages through HTML, CSS, JavaScript, bootstrap and XML.	BTL3	PO4, PO5
CO2	Implement different constructs and programming techniques provided by JavaScript.	BTL1,BTL3	PO4, PO8
CO3	Adapt HTML, CSS, javascript, bootstrap and XML syntax and semantics to build web pages.	BTL1,BTL5	PO4
CO4	Develop Client-Side Scripts using JavaScript to display the contents dynamically	BTL3	PO4,PO5
List of Practicals			

S. No.	Detailed Statement	Mapping to CO #
Core Practicals		

1.	Make following five different web pages:
	   i. Formatting Styles and Headings: Include Bold, italics, Underline, Strike, Subscript, superscript and all six type of headings
	   ii. Font Styles and Image tag
	   iii. Marquee: Move text, image and hyperlink
	   iv. Other tags: br, hr, pre, p
	Include following specifications:
	  ● In all these web pages only mention about use, attributes apply them.
	  ● Insert a background image on home page
	  ● Make all the topics as hyperlinks and go to some other page for description
	  ● Insert a marquee showing HTML Tutorial as moving text.
	  ● Use different font style for different topics
	  ● On every page, make a hyperlink for going back to home page and internal link also.
		CO1, CO3

2.	Create an unordered list nested inside ordered list and apply the following : ● Insert an image of Main item on top right corner of web page.	CO1, CO3

	● Display heading as a marquee. ● Use different font styles and colors for different ordered list items. ● Insert horizontal line after each ordered item.	
3.	Design a table with row span and column span and make use of attributes colspan, rowspan, width, height, cellpadding, cellspacing etc.	CO1, CO3
4.	Design following frame: Explanation MAIN MENU - - - - - - - - - - Topic 1 - - - - - - - - - - Topic 2 View Example Topic 3 Example	CO1, CO3
5.	Make an image map showing the usage of shape, coords, href attributes in map definition. Link each hotspot to their respective details. All the web pages should be designed with proper background color, images, font styles and headings.	CO1, CO3
6.	Design Student registration form for admission in college.	CO1, CO3
7.	Create a webpage and show the usage of inline and internal style sheet and external style sheet?	CO1, CO3
8.	Create a webpage containing a background image and apply all the background styling attributes?	CO1, CO3
9.	Create a web page showing the usage of font styling attributes	CO1, CO3
10.	Create a web page and apply all Text styling attributes use Id and class selector.	CO1, CO3
11.	Create a webpage and implement all list styling attributes.	CO1, CO3
12.	Create a Webpage with three equal columns.	CO1, CO3
13.	Create a webpage containing bootstrap table.	CO1, CO3
14.	Create a webpage containing various types of images.	CO1, CO3

15.	Create a webpage containing various types of buttons	CO1, CO3
16.	Create a webpage containing various, typography classes.	CO1, CO3
17.	Create a webpage containing to display the heading using. Jumbotron.	CO1, CO3
18.	Write a program to show the usage of inbuilt functions and dialog boxes.	CO2
19.	Write a program to show the usage of alert box and confirm box	CO2
20.	Write a program to implement event handling using onclick, onmouseover and onmouseout events.	CO2
21.	Write a program to show the usage of all the date, math and string object functions	CO2
22.	WAP to display the bookstore details in XML with CSS and internal DTD.	CO1, CO3
23.	WAP to format the Teacher details in XML with CSS using external DTD	CO1, CO3
Application Based Practical		
24.	Design the registration form for a web site and when the user clicks on submit button the login form should be appeared on the screen (use external javascript file).	CO4
25.	Design a website and apply all the features of HTML, css, javascript and bootstrap to make the website attractive.	CO4
26.	Write a JavaScript function that creates a table, accept row, column numbers from the user, and input row-column number as content (e.g. Row-0 Column-0) of a cell.	CO2
27.	Zebra-striped Tables: Setting different background colors for alternate rows is a popular technique to improve the readability of tables that has large amount of data. This is commonly known as zebra-striping a table. Make use of pseudo classes to create zebra stripped Table.	CO2
28.	Create a Questionnaire related to any topic of your choice by using Form Elements.	CO4

Note:
1. In total 15 practicals to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

Bachelor of Computer Applications

Course Code: BCA 181+   L T C

Course Name: Bridge Course in Mathematics   **2 0 0**

INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit. 2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any. 3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

Aim: To build mathematical aptitude of the students for understanding the basic concepts of core courses of mathematics of the programme.

LEARNING OBJECTIVES:

The objectives of this course is to provide the learners

- The knowledge about the matrices, determinants and limits.
- Familiarity with basic concepts of differential and integral calculus.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Understand the various approaches dealing the data using theory of matrices	BTL2	PO1, PO2, PO3, PO4
CO2	Understand and apply the concepts of determinants	BTL3	PO1, PO2
CO3	Understand the concept of calculus such as limit, continuity and differentiability.	BTL4	PO1, PO2, PO3, PO4,PO5
CO4	Appraise and determine the correct logic and solutions for any given real world problem using application of integration& integral calculus.	BTL5	PO1, PO2, PO3, PO4, PO5

Bachelor of Computer Applications

UNIT-I

No. of Hrs. 10 Chapter/Book Reference: TB2 [chapters 8, 9, 10 24, 25, 26, 27], TB3 [chapter 1]

MATRICES: Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operations on matrices: Addition, multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication, invertible matrix.

DETERMINANTS: Determinant of a square matrix (up to 3 x 3 matrices), properties of determinants, minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix, solving system of equations using matrix method, Cramer rule (only two and three unknown).

INTRODUCTION TO TRIGONOMETRIC FUNCTIONS: Degree and radian measurements of an angle, Quadrant system, allied angles, and Simple problems based: on Sum/difference of angles of t functions, C and D Formulae, t functions of multiple angles.

UNIT-II

No. of Hrs. 12 Chapter/Book Reference: TB1 [chapters 4, 12] TB2 [chapters 29, 30, 35, 36] TB3 [3, 4, 5, 13]

LIMITS, CONTINUITY AND DIFFERENTIABILITY: : Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions(simple problems only) , derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives (simple problems only)

INTEGRATION: Integral as Limit of Sum, Riemann Sum, Fundamental Theorem of Calculus, Indefinite Integrals, Simple problems based on Methods of Integration Substitution, By Parts, Partial Fractions, Integration of Algebraic and transcendental Functions.

TEXT BOOKS:

TB1. Mathur A B, Jaggi V P "A Textbook of Engineering Mathematics" Khanna Publishers, 3rd edition, 2000

TB2. Dass H K "Applied Mathematics for polytechnics" CBS publishers, 10th edition, 2010

TB3. Singh J P "Calculus" ANE Books, 2nd edition 2012

REFERENCE BOOKS:

RB1.   Kresyig E., "Advanced Engineering Mathematics", 5th Edition, John Wiley & Sons, 1999

RB2. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, Latest Edition.

RB3. Grewal B S, "Elementary Engineering Mathematics", 34th Edition. 1998.